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NEW SPECIES IN THE GENUS *EUCERCERIS* WITH NOTES ON RECORDED SPECIES AND A REVISED KEY TO THE GENUS

(Hymenoptera: Sphecidae)

BY H. A. SCULLEN

Department of Entomology, Oregon State College, Corvallis, Ore.

(continued)

Eucerceris mellea Scullen, new species

Figs. 5A, B, C, D, E, F; 14

This species is being described from a series taken mostly in the Chisos Mt., in the Big Bend Park of Western Texas. Many males were taken but only one female. Both sexes are easily separated from other known species.

Female. Length 13 mm. Head slightly wider than thorax, normally pitted, clothed with short amber hairs; mandibles with an undivided tooth, yellow to ferruginous becoming fuscous on the tips and denticles; clypeus broad and short with a low rounded cone-shaped elevation on the media lobe, yellow except for borders and denticles, with two lateral undivided denticles and a medial trilobed process on the apical border of the medial lobe; antennæ normal in form, ferruginous proximally becoming darker distally; front narrowed dorsally, yellow to fulvous except for black vittæ extending through the antennal scrobes to and along the dorsal clypeal border; vertex fuscous to black; occiput and genæ ferruginous.

Thorax moderately pitted and clothed with amber hairs, black to fuscous except posterior ridge of pronotum, scutellum, metanotum, large areas on the sides of the propodium, prothoracic tubercles, spots back of tubercles, tegula and small patches on the mesa- and metasternum which are ferruginous to yellow; enclosure deeply ridged parallel to base; legs ferruginous; wings subhyaline with the anterior half of the forewing clouded, second submarginal cell petiolate. (Fig. 5B).

Abdomen sparsely pitted on convex areas, closely and finely pitted on concave areas; tergum yellow except medial parts of depressed areas on tergites 2, 3 and 4 and borders of tergites which are ferruginous; venter ferruginous except for broad bands of yellow on sternites 3, 4 and 5 and on irregular area on sternite 2;

pygidial area (fig. 5C) oval, truncate proximally, bordered by a carina and fringed with a row of amber bristles.

Male. Length 13 mm. Head slightly wider than the thorax, punctation medium, clothed with silvery hairs becoming a compact row on the apical border of the lateral wings of the clypeus; mandibles nondentate, ferruginous becoming darker distally; clypeus tridentate on the apical border of the medial lobe, yellow except apical and dorsal margins; antennæ normal in form, ferruginous becoming darker distally; front narrowed dorsally, yellow except for black vittæ extending through antennal scrobes and wedge-shaped extensions of black in contact with the compound eyes; vertex black, occiput black becoming ferruginous on the genæ.

Thorax moderately pitted, black except fulvous band on posterior border of prothorax, triangular area back of tubercle, spot on tegula, metanotum and small patches on the mesa- and metasternum; sutellum ferruginous; enclosure moderately ridged with ridges subparallel to base; legs ferruginous, becoming darker proximally and lighter distally; wings subhyaline with a darkened area on the forewing extending along the distal two thirds of the anterior half; second submarginal cell not petiolate. (Fig. 5E).

Abdomen sparsely pitted on convex areas and closely and finally pitted on concave areas; tergum with yellow bands on convex ridges of tergites 2, 3, 4 and 5; tergite 1 fulvous distally becoming very dark proximally; tergite 6 with a broad yellow band, depressed areas ferruginous; sternites 3 and 4 with broad yellow bands; sternite 5 with yellow patches laterally, with a short divided compact row of bristles on the posterior border; pygidial area normal (Fig. 5F).

Holotype, female, Calif. Acad. Sci., Ent., Allotype, male, Calif. Acad. Sci., Ent., CHISOS MTS., BIG BEND PARK, TEX., July 6, 1942 (H. A. Scullen). Paratypes, 44 males, Chisos Mts., Big Bend Park, Tex., July 3 to 6, 1942 (H. A. Scullen); 8 males, ibid., July 6, 1942, (E. C. Van Dyke); male, Chisos Mts., Brewster Co., Tex., July 17, 1921, (Carl D. Duncan); male, Davis Mts., Jeff Davis Co., Tex., June 26, 1942 (H. A. Scullen).

EXPLANATION OF FIGURES

Fig. 4B. *E. melanovittata*, ♂, fore wing; 4C. ♂, pygidial area. Fig. 5A. *E. mellea*, ♀, face; 5B. ♀, fore wing; 5C. ♀, pygidial area; 5D. ♂, face; 5E. ♂, fore wing; 5F. ♂, pygidial area. Fig. 6A. *E. arenaria*, ♀, face; 6B. ♀, fore wing; 6C. ♀, pygidial area; 6D. ♂, face; 6E. ♂, fore wing; 6F. ♂, pygidial area. Fig. 7A. *E. baja*, ♂, face; 7B. ♂, fore wing; 7C. ♂, pygidial area. Fig. 8A *E. hespera*, ♂, face; 8B. ♂, fore wing; 8C. ♂, pygidial area.

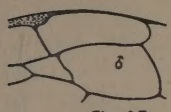


Fig. 4B

Fig. 5B

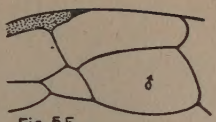


Fig. 5E

Fig. 4C

Fig. 5C

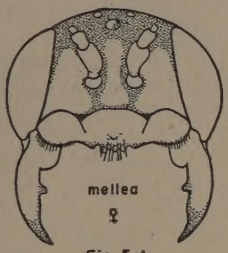


Fig. 5 A

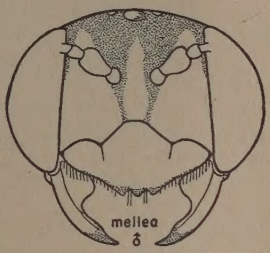


Fig. 5 D

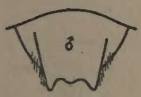


Fig. 5 F

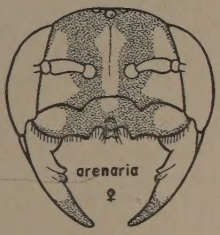
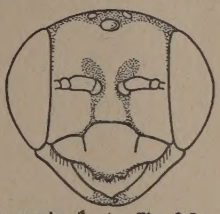


Fig. 6A


arenaria ♂ Fig. 6 D

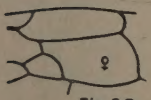


Fig. 6 B

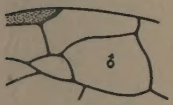


Fig. 6 E

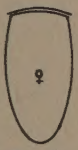


Fig. 6C

Fig. 6 F

Fig. 8C

baja ♂ Fig. 7 A

Fig. 8A

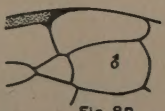


Fig. 8B

Fig. 7C

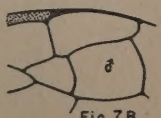


Fig. 7B

EUCERCERIS FULVIPES Cresson

Collections of both males and females of this species in Alberta, at Medicine Hat, Lethbridge and Mannyberries by E. H. Strickland and F. S. Carr extend the range much further northeast than it has heretofore been recorded.

Eucerceris arenaria Scullen, new species

Figs. 6A, B, C, D, E, F; 15

This species superficially resembles *E. vittatifrons* Cresson. The males are easily separated from *vittatifrons* by the fact that the second submarginal cell is not petiolate as in that species, and the pale vittæ of the face are united above the antennæ. One male from near Mesa, Ariz., did not have the pale vittæ fused above the antennæ. It was not included in the type series. The females of the two species are separated by the more pronounced elevation on the medial lobe of the clypeus in *arenaria*, the slightly different color pattern on the faces and the differences in the denticles on the mandibles. *E. arenaria* is so far recorded only from the southwest deserts. (Fig. 15).

Female. Length 11 mm. Black with cream colored markings. Head moderately pitted, subequal to thorax in width, black except for cream colored vittæ which extend along the mesal borders of the compound eyes and onto the lateral wings of the clypeus, a narrow cream vitta between the antennæ extending the same distance dorsally as the lateral markings of the face, and elongated creamy patches lateral of the eyes; mandibles with two closely joined teeth equal in prominence but the distal one much broader, fuscous becoming darker at the tip and on the denticles; clypeus short and broad with a somewhat cone-shaped process on the medial lobe, two broadly separated single acute teeth on the apical clypeal border between which is a short row of long bristles below which in turn is a truncate process; antennæ normal in form, ferruginous proximally becoming darker distally.

Thorax somewhat sparsely pitted, sparsely clothed with very short hairs, black except for narrow band on posterior border of prothorax extending from and including the tubercles, two small lateral spots on the mesoscutellum, the metanotum, small triangular spots back of the tubercles and pyriform patches on the propodium which are cream colored; enclosure with prominent ridges subparallel to the base; sternum black to fuscous, creamy spot on mesosternum; legs ferruginous becoming fuscous on coxæ; wings almost colorless except for a clouded area in the region of the marginal cell and apex of the fore wing; second submarginal cell petiolate (Fig. 6B).

Abdomen sparsely punctate; tergum black with narrow creamy white bands on the posterior ridges of tergites 2, 3, 4 and 5, a broad emarginate band on tergite 1; venter fuscous; pygidial area (Fig. 6C) oval tapering distally.

Male. Length 11 mm. Head subequal to thorax in width, moderately punctate, clothed with very short setæ becoming longer along the clypeal border and forming a cluster on the apical borders of the lateral wings of the clypeus; mandibles nondentate, yellow and ferruginous with dark tips; clypeus creamy yellow except for the apical border and lines partly dividing the lateral wings from the medial lobe, which are black, tridentate on the apical border of the medial lobe; antennæ normal in form, ferruginous becoming darker distally; front creamy yellow with pale vittæ meeting above the antennæ, black vittæ narrow, extending through the antennal scrobes and onto the clypeus; vertex, occiput and genæ black except for irregular oval patches on the genæ.

Thorax somewhat sparsely pitted, clothed with very short hairs, black except for band on posterior border of thorax extending from and including the tubercles, band on mesoscutellum, metanotum, two small areas back of the tubercles on the mesopectus, pyriform areas on the propodium, patches on meso- and metasternum which are cream colored; enclosure deeply ridged subparallel to base; legs ferruginous with some yellow on coxæ, and the pro- and mesafemora and tibiæ; wings subhyaline except for clouded area on the fore wing in the region of the second submarginal cell and adjoining cells; second submarginal cell not petiolate. (Fig. 6E).

Abdomen moderately pitted, black with wide creamy bands on tergites 1 and 2, narrower bands on tergites 3, 4, 5 and 6; venter fuscous with wide creamy bands on sternites 2, 3 and 4, two lateral and one small medial creamy spot on sternite 5; sternite 5 with a long row of loosely packed bristles; pygidial area (Fig. 6F) normal.

Holotype, female, P. H. Timberlake, HELENDALE, CALIF., Sept. 14, 1935 (P. H. Timberlake). Allotype, male, Cushinbury Spgs., Calif., August 16, 1937, on *Solidago confinus* (P. H. Timberlake). Paratypes, male, Cochella, Riverside Co., Calif., July 15, 1927 (F. H. Wymoure); male, Cushinbury Spgs., Calif., Sept. 1, 1936 (P. H. Timberlake); female, male, Cushinoury Spgs., Calif., Aug. 16, 1937, on *Solidago confinus* (P. H. Timberlake); 2 females, 4 males, Cushinbury Spgs., San Bernardino Co., Calif., Aug. 19, 1932 (C. D. Michener); male, 15 mi. n. of El Paso, Tex., June 23, 1942 (H. A. S.); El Paso, Tex., Oct. 3, 1943 (R. W. Strandtmann); 2 males, Florence, Ariz., May 30, 1903; male, Gila Valley, Ariz., Sept. 13, 1935 (Parker); 4 females, Helendale, Calif., Sept. 14, 1935 (P. H. Timberlake); female, Jacumba, Calif., Aug. 12, 1935 (E. I. Beamer); 3 males, Jacumba, Calif., Aug. 12, 1935 (Jean Russell); female, male, 10 to 17 mi. e. of Las Cruces, N. M., June 18, 1942 (H. A. S.); male, 10 mi. e. of Mesa, Ariz., June 11, 1942 (E. C. Van Dyke); 3 females, 9 males, 20 mi. e. of Mesa, Ariz., June 11, 1942 (E. C. Van Dyke); 4 males, female, 25 mi.

e. of Mesa, Ariz., June 11, 1942 (H. A. S.); male, Phoenix, Ariz., Sept. 1, 1935 (Parker); male, Salt River Mts., Ariz., 1300 ft. elev., May 9, 1926 (A. A. Nichol); male, Whitewater Cyn., Calif., Sept. 4, 1935, at *Lepidospartum squamatum* (P. H. Timberlake); 2 females, Yucca Val., Calif., Sept. 20 and 30, 1944 (P. H. Timberlake); female, Yucca Val., Calif., Oct. 5, 1934 (A. J. Basinger).

Eucerceris baja Scullen, new species
Figs. 7A, B, C; 14

Male. Length 11 mm. Head subequal to thorax in width, moderately punctate, clothed with short silvery hairs; mandibles nondentate, yellow becoming fulvous on the distal third; clypeus tridentate on the apical margin of the medial lobe, creamy yellow except for the denticles which are fulvous; antennæ normal in form, fuscous dorsally becoming lighter ventrally, yellow patches on scapes; front with sides subparallel, dark, narrow vittæ extending through antennal scrobes to clypeal border, pale vittæ equal in dorsal extent; vertex, occiput and genæ black except for ferruginous areas back of compound eyes.

Thorax moderately pitted, less so on creamy areas, black except for band on posterior border of pronotum extending from and including tubercles, two irregular patches on lateral wings of pronotum, four small spots on the anterior part of the mesoscutum, the tegula, band on the anterior third of the scutellum, the metanotum, large lateral patches on the propodium, two lateral patches on the mesospectus, and a somewhat broken ventral stripe between the coxæ extending from the procoxæ to the metacoxæ all creamy yellow; enclosure deeply ridged subparallel to base; legs ferruginous to fulvous with some creamy yellow patches on all coxæ, profemoratæ, protibiæ, pro- and metatrochanters; wings subhyaline with a darkened area on the costal third of the forewing extending over the distal two thirds; second submarginal cell not petiolate. (Fig. 7B).

Abdomen sparsely punctate on convex ridges, deeply and closely pitted on concave areas; tergum black with narrow creamy yellow bands on posterior ridges of tergites 2, 3, 4, 5 and 6; a broad band on tergite 1; venter fuscous with wide creamy bands on sternites 2 and 3, lateral patches of creamy yellow on sternites 4 and 5; sternites 3 and 4 with long rows of long curved bristles, sternite 5 with a very short row of much shorter bristles; pygidial area (Fig. 7C) normal in form.

Holotype, male, Calif. Acad. Sci., Ent., 20 mi. n. of MESQUITAL, LOWER CALIFORNIA, Sept. 27, 1941 (Ross and Bohart). Paratypes, 5 males, Angeles Bay, Gulf of Calif., June 26 and 27, 1921 (E. P. Van Duzee); 2 males, 30 and 40 mi. s. of El Arco Mine, Lower

California, June 23, 1938 (Michelbacher and Ross); 3 males, Las Animas Bay, Gulf of Calif., May 8, 1921 (E. P. Van Duzee); 13 males, 20 mi. n. of Mesquital, Lower California, Sept. 27, 1941 (Ross and Bohart).

EUCERCERIS ELEGANS Cresson

Since the author's 1939 publication on this genus he has had an opportunity to study a large collection of closely related species taken in the southwest. These studies have cast a shadow of doubt on some of the present synonymy relating to *E. elegans* Cr. as set forth in the above publication. Biological studies may be necessary to prove that *E. pimarum* Ckll. and Rohwer is the female of *E. elegans* Cr. and further studies may show that *E. respera* Scullen, new species, is a synonym of *E. Elegans*.

EUCERCERIS BITRUNCATA Scullen

A careful examination of a large series of this species from the southwest fails to show any structural difference between it and *E. pimarum* Ckll. and Rohwer with the exception of color shade of the lighter markings and the width of the bands of yellow on the abdomen. The lighter markings of *E. bitruncata* Scullen are more yellow and the abdominal bands are wider than is true for *E. pimarum* Ckll. and Rohwer. Further comparisons with the type may show these two species to be synonymous. Compare notes under *E. conata* Scullen and *E. elegans* Cr.

Eucerceris hespera Scullen, new species
Figs. 8A, B, C; 14

This may prove to be the male of either *E. conata* Scullen or *E. bitruncata* Scullen. It is similar in general appearance to the male of *E. canaliculata* (Say) from which it is distinguished by its smaller size and by the fact that the yellow of the face fuses above the antennæ, which is not usual with the latter species. It is also very similar to *E. triciliata* Scullen, new species, from which it is separated by the dierence in the row of bristles on the fifth sternite.

Male. Length 11 mm. Head slightly wider than thorax, moderately punctate, clothed with very short hairs; mandibles nondentate, ferruginous becoming darker distally; clypesu tridentate on the apical margin of the medial lobe, setæ longer on the apical margin and denticles which are ferruginous; antennæ normal in form, ferruginous proximally becoming darker distally; front,

sides subparallel, yellow except for isolated short vittæ through the antennal scrobes; vertex black; occiput and genæ fuscous.

Thorax moderately to sparsely punctate, fuscous to ferruginous except broad band on pronotum extending from and including tubercles, four short vittæ on mesocutum, wide band on scutellum and triangular areas on mesopectus back of tubercles, which are yellow; enclosure ridged at 45° angle to base except distal third which is smooth; legs ferruginous except for yellow patches on precoxæ; wings subhyaline except for a clouded area on the distal two thirds of the costal half of the forewing; second submarginal cell not petiolate. (Fig. 8B).

Abdomen moderately punctate, broad yellow bands on tergites 1, 2, 3, 4 and 5, lateral yellow patches on sternites 3 and 4; remainder of abdomen ferruginous; sternites 3 and 4 with long rows of long bristles on posterior margins; sternite 5 with a very short row of short bristles on the posterior margin; pygidial area (Fig. 8C) normal.

Holotype, male, Calif. Acad. Sci., Ent., 25 mi. e. of EL PASO, TEX., U. S. Highway 62, Desert, July 13, 1942 (H. A. Scullen). Paratypes, 2 males, 20 mi. n. of El Paso, Tex., June 19, 1942 (H. A. S.); 2 males, El Paso Tex., June 19, 1942 (E. C. Van Dyke); 42 males, 10 to 20 mi. e. of El Paso, Tex., June 21-22, 1942 (H. A. S.); 37 males, 10 to 20 mi. e. of El Paso, Tex., June 21 - 22, 1942 (E. C. Van Dyke); 4 males, 25 mi. e. of El Paso, Tex., July 13, 1942 (H. A. S.); 2 males, 25 mi. e. of El Paso, Tex., July 13, 1942 (E. C. Van Dyke); 2 males, El Paso, Tex., Sept. 27, 1943 (R. W. Strandtmann); male, Las Cruces, N. M., June 19, 1942 (E. C. Van Dyke); male, Van Horn, Tex., June 24, 1942 (E. C. Van Dyke).

EUCERCERIS CONATA Scullen

This species was taken in large numbers by Dr. E. C. Van Dyke and the writer in the region of El Paso, Tex., in the summer of 1942. *E. respera* Scullen, new species, and *E. triciliata* Scullen, new species, are so near in size, general appearance and distribution to both *E. conata* Scullen and *E. bitruncata* Scullen it has been impossible to associate them positively, but it is probable each of the new males will prove to be one of the above species when further biological studies are made.

Eucerceris triciliata Scullen, new species
Figs. 9A, B, C; 15

This may prove to be the male of *Eucerceris conata* Scullen or

E. bitruncata Scullen. It superficially resembles each of the two species and is abundant in the same area. The male of this species closely resembles the male of *E. canaliculata* (Say) from which it is distinguished by the relatively smaller and more compact

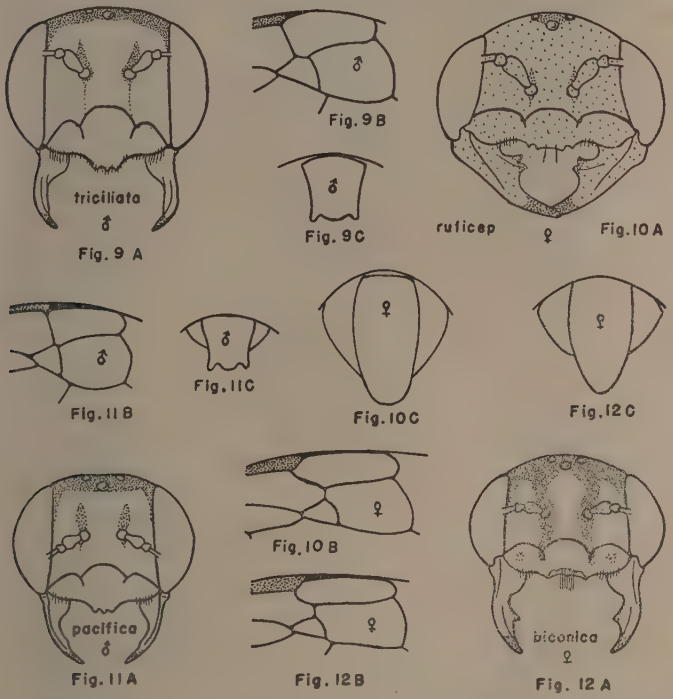


Fig. 9A. *E. triciliata*, ♂, face; 9B. fore wing; 9C. pygidial area. Fig. 10A. *E. ruficeps*, ♀, face; 10B. ♀, fore wing; 10C. ♀, pygidial area. Fig. 11A. *E. pacifica*, ♂, face; 11B. ♂, fore wing; 11C. ♂, pygidial area. Fig. 12A. *E. biconica*, ♀, face; 12B. ♀, fore wing; 12C. ♀, pygidial area.

row of bristles on the fifth sternite of the latter species and the fact that the pale vittæ, except in rare cases, fuses above the antennæ. In *E. canaliculata* the pale vittæ do not as a rule fuse.

Male. Length 11 mm. Head slightly wider than thorax, moderately punctate, clothed with short silvery hairs becoming longer on the apical border of the clypeus; mandibles nondentate, yellow becoming dark at the tips; tridentate on the apical border of the

medial lobe, normal in form, yellow except for the denticles which are fuscous; antennæ ferruginous proximally becoming darker distally; front creamy yellow fusing above the antennæ, dark vittæ short and narrow passing through the antennal scrobes; vertex black, occiput fuscous turning to ferruginous on the genæ.

Thorax moderately pitted and clothed with short hairs; tergum background black with wide band on prothorax extending from and including tubercles, two small median spots and an elongated area confluent with the tegula on the mesoscutum, tegula, band on scutellum and the metanotum which are creamy yellow; propodium dark medially becoming ferruginous laterally with a large yellow patch on each side; enclosure dark with slight ridges subparallel to base; pleura and venter ferruginous with yellow patches back of the prothoracic tubercles on the mesopectus and yellow on the meso- and metasternum; legs ferruginous with traces of yellow on coxæ and pro- and mesatibia; wings subhyaline with darkened areas on the forewings from the marginal cell to the apex; second submarginal cell not petiolate. (Fig. 9B).

Abdomen sparsely pitted, broad yellow bands on tergites 1, 2, 3, 4, 5 and 6, otherwise fulvous to fuscous; venter fulvous to fuscous with a small yellow spot on sternite 2, a broken yellow band on sternite 3 and lateral yellow spots on sternite 4; long rows of long bristles on the posterior borders of sternites 3, 4 and 5, that on sternite five being slightly smaller; pygidial area normal (Fig. 9C).

Holotype, male, Calif. Acad. Sci., Ent., 20 mi. n. of EL PASO, TEX., June 19, 1942 (H. A. Scullen). Paratypes, male, Albuquerque, N. M., June 27, 1931 (H. A. S.); 3 males, Alpine, Tex., July 1, 8, 1942 (H. A. S.); 2 males, Alpine, Tex., July 1, 8, 1942 (E. C. Van Dyke); 2 males, Bisbee, Ariz., July 18, 1942 (H. A. S.); male, Carrizozo, N. M., July 2, 1929; male, Davis Mts., Tex., July 9, 1942 (E. C. Van Dyke); 18 males, 20 to 33 mi. e. of Deming, N. M., 4000 to 4300 ft. elev., Aug. 2, 1946 (H. A. S.); 8 males, Douglas, Ariz., June 16, 1942 (H. A. S.); male, 30 mi. n. of Douglas, Ariz., July 17, 1942 (H. A. S.); 3 males, Douglas, Ariz., June 16, 1942, (E. C. Van Dyke); male, El Paso, Tex., July 14, 1942 (H. A. S.); 21 males, El Paso, Tex., June 19 and 23, 1942 (E. C. Van Dyke); 19 males, 15 to 20 mi. n. of El Paso, Tex., June 19 and 23, 1942 (H. A. S.); 39 males, 10 to 25 miles e. of El Paso, Tex., June 21 and 23, July 13, 1942 (H. A. S.); 20 males, 10 to 20 mi. e. of El Paso, Tex., July 21-22, 1942 (E. C. Van Dyke); male, 100 mi. e. of El Paso, Tex., July 13, 1942 (H. A. S.); male, 100 mi. e. of El Paso, Tex., July 13, 1942 (E. C. Van Dyke); male, Las Cruces, N. M., June 18, 1942

(E. C. Van Dyke); male, 28 mi. n. e. of Las Cruces, N. M., Aug. 2, 1946 (H. A. S.); 2 males, Lordsburg, N. M., 4600 ft. elev., Aug. 1, 1946 (H. A. S.); 3 males, McNary, Hudspeth Co., Tex., June 14, 1942 (H. A. S.); male, Mesilla Park (state?) Oct. 14, 0000 (Cockerell); 3 males, Patagonia, Ariz., June 15, 1942 (E. C. Van Dyke); 2 males, Sierra Blanca, Tex., 4500 ft. elev., June 24, 1942 (H. A. S.); 2 males, Sierra Blanca, Tex., July 9, 1917; male, Sierra Blanca, El Paso Co., Tex., July 8, 1917 (J. Bequaert); 3 males, Silver City, N. M., 5000 - 6000 ft. elev., July 3 and 9, 1936 (R. T. Kellogg); male, Socorro, N. M., 4579 ft.

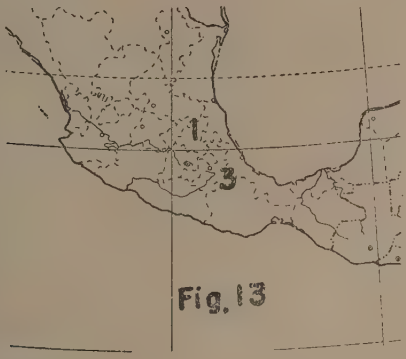


Fig. 13. Distribution map for *E. brunnea* (1) and *E. melanosa* (3).

elev., Aug. 4, 1946 (H. A. S.); 4 males, Tombstone, Ariz., 4500 ft. elev., June 15, 1942 (H. A. S.); male, Van Horn, Tex., June 24, 1942 (E. C. Van Dyke).

Eucerceris ruficeps Scullen, new species
Figs. 10A, B, C; 14

This species superficially resembles *E. conata* Scullen, *E. elegans* Cresson and *E. bicornuta* Scullen from which it may be separated by the structure of the clypeal margin.

Female. Length 12 mm. Head noticeably wider than the thorax; moderately punctate, clothed with short amber hairs becoming longer on the clypeus; entire head ferruginous except for a crescent-shaped area on the vertex connecting the two compound eyes and embodying the ocelli, a darkened area on the occiput, the

tips of the mandibles and the mandibular denticles; mandibles with two contiguous denticles subequal in size and form; clypeus broad and short, clypeal border with two widely separated pairs of denticles, the proximal ones more acute, between the pairs of denticles is a slight medial elevation on the medial lobe, below this a few long bristles and below the bristles a broad truncate process; front slightly converging dorsally; antennæ normal in form, ferruginous.

Thorax normally punctate, clothed with short amber hairs; tergum black except for the following parts which are yellow: broad band on the posterior border of the prothorax, extending from and including the tubercles, patches back of the tubercles, the tegula, broad band on scutellum, metanotum, large patches on the propodium, minute elongated lateral spots on the enclosure; enclosure deeply ridged at an angle with the base; venter black with large ferruginous areas on the mesospectus, meso- and metasternum; legs ferruginous except for coxæ which are darker, a spot of yellow on the metacoxæ; wings subhyaline except for a darkened area on the costal half of the forewing, second submarginal cell petiolate. (Fig. 10B).

Abdomen closely and finely punctate, clothed with very short silvery hairs; tergum with broad yellow bands on all tergites except the 6th; sternum with broad yellow bands on sternites 2, 3 and 4, that on sternite 2 divided, the others emarginate; pygidial area (Fig. 10C) with sides subparallel, slightly truncate distally, bordered by the usual carina and fringed with bristles.

Holotype, male, Calif. Acad. Sci., Ent., Antioch, Calif., Aug. 7, 1938 (J. W. McSwain). Paratypes, male, Antioch, Calif., June, 8, 1933, (G. E. & R. M. Bohart); male, Antioch, Calif., Sept. 2, 1938 (G. E. Bohart); male, Antioch, Calif., May 21, 1936 (E. C. Van Dyke); male, Antioch, Calif., Sept. 15, 1935, male, Johnnie, Nev., July, 1935.

Eucerceris pacifica Scullen, new species
Figs. 11A, B, C; 14

Male. Length 10 mm. Moderately to sparsely punctate, black with cream colored markings, clothed with very short silvery hairs becoming a distinct row of longer hairs on the clypeal border. Head subequal to thorax in width; mandibles nondentate, cream colored, except tips which are fuscous; clypeus tridentate, cream colored; antennæ normal in form, fuscous except for creamy patches on the scape; front with cream color fusing above the antennæ, short black vittæ passing through the antennal scrobes; vertex, occiput and genæ black except for creamy spots confluent with the lateral borders of the compound eyes.

Thorax black except for a broad band on the prothorax extending from and including the tubercles, patches on the tegulæ, four somewhat pyriform patches on the mesoscutum, a divided band on the scutellum, the metanotum, large pyriform patches on the propodium, which are cream colored; sternum and pleura black except for a somewhat T-shaped area on the mesopectus with the wings of the T fusing with patches back of the tubercles of the thorax,

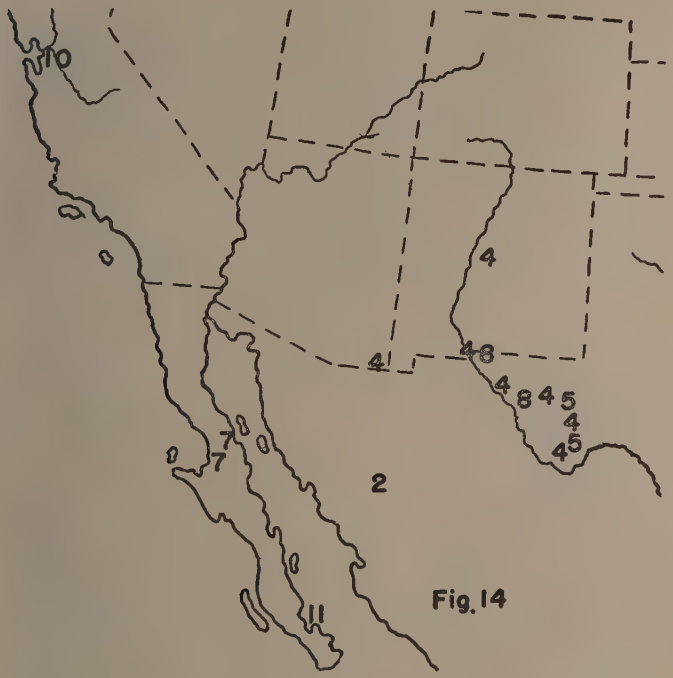


Fig. 14. Distribution map for *E. velutina* (2), *E. melanovittata* (4), *E. mellea* (5), *E. hespera* (7), *E. ruficeps* (8), *E. baja* (10) and *E. pacifica* (11).

patches on the prosternum, mesasternum and metasternum which are cream colored; enclosure moderately ridged at an angle with the base, with a central groove; legs black and creamy colored becoming fuscous to fulvous on the tarsi; wings subhyaline except for a darkened patch in the region of the marginal, second submarginal and third submarginal cells; second submarginal cell not petiolate (Fig. 11B).

Abdomen black except for a broad emarginate band on tergite 1, a broad band on sternite 2, complete narrow bands on the distal ridges of tergites 3, 4, 5 and 6, broken bands on proximal ridges of tergites 3 and 4, broken irregular band on sternite 2, band on sternite 3, lateral patches on sternites 4 and 5 which are cream colored; sternites 3 and 4 with long rows of long bristles, sternite five with a short row of short bristles; pygidial area (Fig. 11C) normal in form.

Holotype, male, Calif. Acad. Sci., Ent., SAN PEDRO, LOWER CALIFORNIA, Oct. 7, 1941, on Compositæ (Ross and Bohart). Paratypes, two males, San Pedro, Lower California, Oct. 7, 1941, on Compositæ (Ross and Bohart); male, 10 mi. northwest of La Pez, Lower California, Oct. 6, 1941 (Ross and Bohart).

EUCERCERIS INSIGNIS Provancher

Four males and one female of this species taken at Myers, Humboldt Co., Calif., July 7, 1937, by Dr. E. C. Van Dyke extends the known range much farther north than formerly.

EUCERCERIS FERRUGINOSA Scullen

The known range of this species has been considerably extended by a collection of six specimens taken 20 mi. north of Mesquital, Lower California, Sept. 27, 1941, by Ross and Bohart.

Eucerceris biconica Scullen, new species
Figs. 12A, B, C; 15

Female. Length 10 mm. Head subequal to thorax in width, moderately pitted, clothed with very short amber hairs; mandibles with one undivided tooth, ferruginous with the tips and denticles fuscous to black; clypeus yellow with the dark vittæ extending half way between the lobes, lateral lobes with low rounded cone-shaped elevations, medial lobe very flat; clypeal border with two blunt lateral projections, between is a smaller blunt medial projection, mesad of each lateral process is a depressed spot, above each depression is a minute denticle and between the denticles there is a short row of long bristles; antennæ normal in form, ferruginous proximally becoming darker distally; front with lateral yellow areas blending into ferruginous confluent with the compound eyes, similar narrowed patch between the antennæ, fuscous to black vittæ extending through the antennal scrobes to and onto the clypeus; vertex fuscous to black; occiput and genæ ferruginous.

Thorax sparsely punctate, background fuscous to black; prothorax with a broad yellow band bordered with fulvous extending from and including the tubercles; mesoscutum with an irregular

band of ferruginous; scutellum fulvous becoming yellow distally; metanotum yellow; propodium with large lateral yellow patches turning to ferruginous and then to fuscous medially; enclosure nearly smooth with the inconspicuous ridges subparallel to base, with a medial groove, fuscous; legs ferruginous; wings subhyaline, clouded area of the forewing extending over the anterior two thirds, second submarginal cell petiolate. (Fig. 12 B).

Abdomen largely yellow on the tergum with the depressed areas and proximal border fuscous to fulvous; venter fulvous to ferruginous with traces of yellow; pygidial area (Fig. 12C) rounded distally but truncate proximally, bordered by a carina and fringed with bristles.

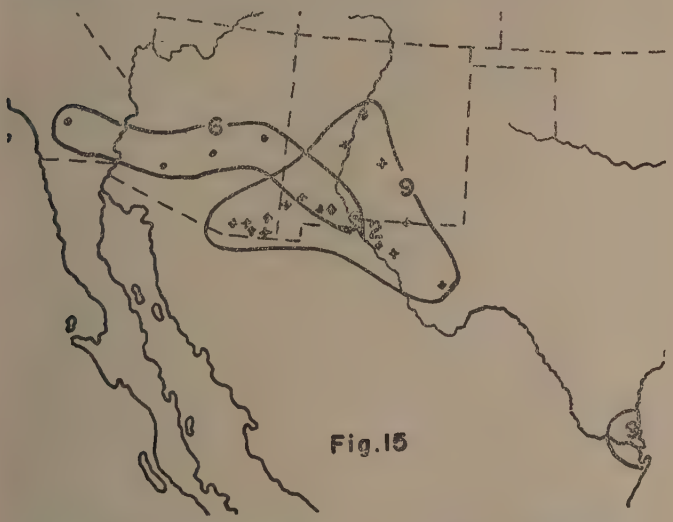


Fig. 15. Distribution map for *E. arenaria* (6), *E. triciliata* (9) and *E. biconica* (12).

Holotype, female, Calif. Acad. Sci., Ent., 15 mi. north of EL PASO, TEX., June 23, 1942 (H. A. Scullen).

EUCERCERIS CANALICULATA (Say)

The records extend the known range of this species into Mexico: Female, San Carlos, Chihuahua, Mex., June 14, 1938 (Rollin H. Baker); Fuente, Mex., June 12, 1938 (Rollin H. Baker); 20 mi. north of Mesquital, Lower Calif., Mex. (462.5 mi. south of Tijuana), Sept. 27, 1941 (Ross and Bohart); 20 mi. north of Comondu, Lower Calif., Mex. (758.3 mi. south of Ti-

juana); 20 mi. south of El Arco, Lower Calif., Mex. (537.4 mi. south of Tijuana); 10 mi. east of San Ignacio, Lower Calif., Mex. (about 561 mi. south of Tijuana). The species was found in large numbers in the region of El Paso, Tex., by Dr. E. C. Van Dyke and the writer in June and early July, 1942.

GROUP C

Second submarginal cell petiolate in both sexes

EUCERCERIS VITTATIFRONS Cresson

The known range of this species is extended much farther to the southeast by a female taken in the Chesos Mts., Tex., Sept. 19, 1938, by D. J. and J. N. Knull.

EUCERCERIS TRICOLOR Cockerell

This species was taken in large numbers in southern Arizona by Dr. E. C. Van Dyke and the writer in June and early July, 1942.

EUCERCERIS MONTANA Cresson

The known range of this species has been extended farther west into southern Arizona by the following records: male, Huachuca Mts., Ariz., June 15, 1920 (F. X. Williams); male, female, 10 mi. east of Douglas, Ariz., Aug. 11, 1940 (E. S. Ross); 3 males, Douglas, Ariz., June 16, 1942, (H. A. Scullen); male, female, 30 mi. north of Douglas, Ariz., July 17, 1942 (H. A. Scullen); 2 males, Douglas, Ariz., June 16, 1942 (E. C. Van Dyke); male, 23 mi. northeast of Douglas, Ariz., 4500 ft. elev., Aug. 1, 1946 (H. A. Scullen). The species was taken in considerable numbers from the Davis Mts., south to the Chesos Mts., in June and early July, 1942, by Dr. E. C. Van Dyke and the writer.

EUCERCERIS ANGULATA Rohwer

The following records are of interest for this uncommon species: 9 males, San Pedro, Lower Calif., Mex., Oct. 7, 1941 (Ross and Bohart); 6 males, 3 females, 10 miles east of San Ignacio, Lower Calif., Mex., (about 561 mi. south of Tijuana), Sept. 30, 1942 (Ross and Bohart); 2 males, Coyote Cove, Concepcion Bay, Lower Calif., Mex., Oct. 1, 1941 (Ross and Bohart); male, Big. Cyn., Sierra Laguna, Lower Calif., Mex., Oct. 13, 1941 (Ross and Bohart); male, Bensen, Ariz., 3700 ft. elev., July 26, 1946 (H. A. Scullen).

MOSQUITO RECORDS FROM WYOMING AND YELLOWSTONE NATIONAL PARK

(Diptera: Culicidæ)

DON M. REES
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FRED C. HARMSTON
S. A. Sanitarian (R), U. S. Public Health Service

This report is based on a study of the mosquitoes in the insect collections of the University of Utah and the Utah State Agricultural College, and specimens collected by personnel of the U. S. Public Health Service, Malaria Control in War Areas and Communicable Disease Center Activities Programs. Specimens have been examined from nearly all sections of the state and it is believed that the material available for study has been sufficient to provide a rather accurate index to the mosquito fauna of Wyoming. In order to make the list as complete as possible the writers have included all available records from the works of Dyar, and others, that have come to their attention. For convenience the mosquitoes and collection records have been arranged in alphabetical order. The names of the collectors have been abbreviated as follows: Don M. Rees, (R); L. E. Perry, (P); L. T. Nielsen, (N); G. F. Knowlton (K); F. C. Harmston, (H).

LIST OF SPECIES RECORDED

1. *Aedes campestris* Dyar & Knab.
2. *Aedes canadensis* (Theobald).
3. *Aedes cataphylla* Dyar.
4. *Aedes cinereus* Meigen.
5. *Aedes communis* (DeGeer).
6. *Aedes diantaeus* Howard, Dyar & Knab.
7. *Aedes dorsalis* (Meigen).
8. *Aedes excrucians* (Walker).
9. *Aedes fitchii* (Felt & Young).
10. *Aedes idahoensis* (Theobald).
11. *Aedes impiger* (Walker).
12. *Aedes increpitus* Dyar.
13. *Aedes intrudens* Dyar.
14. *Aedes nearcticus* Dyar.
15. *Aedes nigromaculis* (Ludlow).
16. *Aedes pionips* Dyar.
17. *Aedes pullatus* (Coquillet).
18. *Aedes punctor* (Kirby).
19. *Aedes schizopinax* Dyar.
20. *Aedes spencerii* (Theobald).
21. *Aedes sticticus* (Meigen).
22. *Aedes stimulans* (Walker).
23. *Aedes triseriatus* (Say).
24. *Aedes trivittatus* (Coquillet).
25. *Aedes vexans* (Meigen).
26. *Anopheles franciscanus* McCracken.

27. *Anopheles freeborni* Aitken.
28. *Anopheles occidentalis* Dyar & Knab.
29. *Anopheles punctipennis* (Say).
30. *Culex apicalis* Adams.
31. *Culex pipiens* Linnæus.
32. *Culex restuans* Theobald.
33. *Culex salinarius* Coquillet.
34. *Culex tarsalis* Coquillet.
35. *Culiseta alaskaensis* (Ludlow).
36. *Culiseta impatiens* (Walker).
37. *Culiseta incidens* (Thomson).
38. *Culiseta inornata* (Williston).
39. *Mansonia perturbans* (Walker).
40. *Psorophora signipennis* (Coquillet).

AEDES CAMPESTRIS Dyar & Knab

Hot Springs County: Thermopolis, March 7, 1944 (P). Lincoln County: Opal, June 7, 1947 (H). Uinta County: Evanston, Ft. Bridger, Lyman and Mountain View, June 25, 1933 (R). Yellowstone National Park: Gibbon Meadows, July 3, 1936 (R).

AEDES CANADENSIS (Theobald)

Yellowstone National Park: Lonestar Geyser, June 30, 1947 (N). Dyar also records the occurrence of this species in the park.

AEDES CATAPHYLLA Dyar

Yellowstone National Park: Gibbon Meadows, June 4, 1933 (R); Yellowstone Lake, June 6, 1947 (N). Dyar reports this species from a number of localities in the park.

AEDES CINEREUS Meigen

Johnson County: Buffalo, June 8, 1947 (H). Lincoln County: Cokeville, September 12, 1945 (H). Uinta County: Ft. Bridger, August 10, 1946 (H). Yellowstone National Park: Fishing Bridge, June 30, 1936 (R).

AEDES COMMUNIS (DeGeer)

Uinta County: Lone Tree, June 25, 1933 (R). Yellowstone National Park: Fishing Bridge, July 3, 1936 (R); West Thumb, June 14, 1936 (K); Sylvan Lake, June 29, 1947 (N). *Communis* is reported by Dyar, from several places in the park.

AEDES DIANTAEUS Howard, Dyar & Knab

Reported by Dyar from Yellowstone National Park.

Aedes dorsalis (Meigen)

Albany County: Laramie, August 19, 1947 (H). Big Horn County: Basin, Cowley, Greybull and Lovell, August 16, 1947 (H). Carbon County: Baggs, June 12, 1947 (H); Rawlins and Three Forks, June 8, 1947 (H). Hot Springs County: Thermopolis, March 7, 1944 (P). Lincoln County: Cokeville, Sage and Smoot, September 12, 1945 (H). Natrona County: Alcova and Midwest, June 8, 1947 (H). Teton County: Jackson, September 11, 1945 (H). Uinta County: Evanston, Ft. Bridger, Lone Tree, Lyman and Mountain View, June 22, 1933 (R).

Aedes excrucians (Walker)

Yellowstone National Park: July 3, 1933 (R); Fishing Bridge, Canyon Junction and Tower Falls, June 30, 1947 (N). This species is also recorded by Dyar from a number of localities in the park.

Aedes fitchii (Felt & Young)

Sublette County: Pinedale, June 11, 1940 (R). Teton County: Jenny Lake, July 4, 1947 (N). Yellowstone National Park: West Thumb, July 3, 1933 (R).

Aedes idahoensis (Theobald)

Carbon County: Baggs, June 12, 1947 (H). Hot Springs County: Thermopolis, March 7, 1944 (P). Lincoln County: Cokeville, September 12, 1945 (H); Opal, June 7, 1947 (H). Uinta County: Evanston, Ft. Bridger, Lyman and Mountain View, June 23, 1933 (R). Yellowstone National Park: Lake Lodge, August 2, 1944 (P). Dyar records this species from a number of places in the park.

Aedes impiger (Walker)

Dyar reports this species from Mammoth Hot Springs and Camp Roosevelt, Yellowstone National Park.

Aedes increpitus Dyar

Big Horn County: Greybull, August 16, 1947 (H). Lincoln County: Kemmerer, June 7, 1947 (H). Sublette County: Daniel,

June 10, 1940 (R). Uinta County: Lone Tree, August 10, 1946 (H). Yellowstone National Park: Fishing Bridge, July 3, 1933 (R). *Increpitus* is reported by Dyar from a number of localities in the park.

AEDES INTRUDENS Dyar

Uinta County: Lone Tree, July 22, 1935 (R). Yellowstone National Park: Fishing Bridge, July 3, 1933 (R). These records are questionable since the identifications were made from female specimens only.

AEDES NEARCTICUS Dyar

Yellowstone National Park: Seven miles east of Old Faithful, June 6, 1947 (N). Identified from larvæ only.

AEDES NIGROMACULIS (Ludlow)

Albany County: Laramie, September 14, 1946 (H); Rock River, August 20, 1947 (H). Big Horn County: Cowley, Greybull and Lovell, August 16, 1947 (H). Carbon County: Baggs, June 12, 1947 (H). Converse County: Douglas, April 7, 1944 (P); June 10, 1947 (H). Hot Springs County: Thermopolis, August 3, 1944 (P). Johnson County: Buffalo, June 10, 1947 (H). Lincoln County: Cokeville, September 12, 1945 (H); Kemmerer and Opal, June 7, 1947 (H). Natrona County: Casper, June 10, 1947 (H). Platte County: Wheatland, June 10, 1947 (H). Uinta County: Lyman, August 10, 1946 (H). Washakie County: Lander, August 17, 1947 (H). This is an extremely troublesome mosquito in many sections of the state, particularly in the open plains regions.

AEDES PIONIPS Dyar

Reported by Dyar from Old Faithful and Yellowstone Lake, in Yellowstone National Park.

AEDES PULLATUS (Coquillet)

Albany County: Centennial, August 19, 1947 (H). Fremont County, Sioux Pass, August 17, 1947 (H). Sublette County: Pinedale, June 11, 1940 (R). Teton County: Jenny Lake, July 4, 1947 (N). Yellowstone National Park: Fishing Bridge, July 2, 1933 (R); Yellowstone Lake, June 6, 1946 (N).

AEDES PUNCTOR (Kirby)

Yellowstone National Park: Yellowstone Falls, July 2, 1933 (R); Lewis Lake, June 28, 1947 (N); Yellowstone Lake, June 6, 1946 (N). Dyar records the occurrence of *punctor* from several localities in the park.

AEDES SPENCERII (Theobald)

Sublette County Daniel, June 10, 1940 (R). Uinta County: Lone Tree, July 6, 1929 (R). Dyar records it from Old Faithful and Yellowstone Lake, Yellowstone National Park.

AEDES SCHIZOPINAX Dyar

Recorded by G. A. Mail, from Mammoth Hot Springs, Yellowstone National Park.

AEDES STICTICUS (Meigen)

Albany County: Rock River, June 11, 1947 (H). Carbon County: Baggs, June 12, 1947 (H). Uinta County: Lone Tree, August 10, 1946 (H).

AEDES STIMULANS (Walker)

Sublette County: Daniel, June 10, 1940 (R). Uinta County: Lone Tree, July 6, 1929 (R); April 14, 1942 (K).

AEDES TRISERIATUS (Say)

Johnson County: Buffalo, June 10, 1947 (H). Washakie County: Worland, August 16, 1947 (H).

AEDES TRIVITTATUS (Coquillet)

Hot Springs County: Thermopolis, August 3, 1944 (P). Natrona County: Casper, June 8, 1947 (H). Platte County: Chugwater, June 10, 1947 (H).

AEDES VEXANS (Meigen)

Albany County: Laramie, June 11, 1947 (H); Rock River, June 11, 1947 (H). Carbon County: Baggs, June 12, 1947 (H); Hanna and Saratoga, August 19, 1947 (H). Converse County: Douglas, June 10, 1947 (H). Hot Springs County: Thermopolis, August 3, 1944 (P). Lincoln County: Afton, Border, Cokeville

and Smoot, September 12, 1945 (H). Platte County: Chugwater, June 10, 1947 (H); Wheatland, August 5, 1944 (P). Teton County: Moran, September 11, 1945 (H). Uinta County: Evanston and Ft. Bridger, August 10, 1946 (H).

ANOPHELES FRANCISCANUS McCracken

Carbon County: Saratoga, August 19, 1947 (H).

ANOPHELES FREEBORNI Aitken

Lincoln County: Afton, July 9, 1941 (R); Cokeville, September 12, 1945 (H); Kemmerer, June 7, 1947 (H). Teton County: Jackson, September 12, 1945 (H). Uinta County: Evanston and Ft. Bridger, August 10, 1946 (H).

ANOPHELES OCCIDENTALIS Dyar & Knab

Converse County: Douglas and Glenrock, August 4, 1944 (P). Fremont County: Lander and Riverton, August 17, 1947 (H). Teton County: Jackson and Moran, September 12, 1945 (H). Yellowstone National Park: West Entrance, September 8, 1945 (H).

ANOPHELES PUNCTIPENNIS (Say)

Teton County: Moran, September 12, 1945 (H). Yellowstone National Park: Mammoth Lodge, September 8, 1945 (H). Olson and Deegan report the occurrence of this species at Ft. Warren, Cheyenne.

CULEX APICALIS Adams

Johnson County: Buffalo, June 10, 1947 (H). Platte County: Chugwater, June 10, 1947 (H).

CULEX PIPIENS Linnæus

Albany County: Laramie, September 14, 1946 (H). Uinta County: Evanston, August 10, 1946 (H). Washakie County: Worland, August 17, 1947 (H).

CULEX RESTUANS Theobald

Carbon County: Rawlins, September 15, 1946 (H); Saratoga, August 19, 1947 (H). Fremont County: Lander, August 17, 1947 (H). Lincoln County: Cokeville, September 12, 1945 (H).

CULEX SALINARIUS Coquillet

Sweetwater County: Rock Springs, September 15, 1946 (H). Washakie County: Tensleep and Worland, August 16, 1947 (H).

CULEX TARSALIS Coquillet

Albany County: Laramie, June 11, 1947 (H); August 19, 1947 (H). Carbon County: Baggs, June 12, 1947 (H); Rawlins, September 14, 1946 (H); Saratoga, August 19, 1947 (H). Fremont County: Lander and Riverton, August 17, 1947 (H). Hot Springs County: Thermopolis, August 16, 1947 (H). Lincoln County: Alpine, September 12, 1945 (H); Kemmerer, June 7, 1947 (H). Sweetwater County: Rock Springs, August 21, 1947 (H). Teton County: Jackson, July 4, 1934 (R). Uinta County: Lone Tree, July 6, 1939 (R), Yellowstone National Park: Old Faithful and Canyon Junction (Dyar).

CULISETA ALASKAENSIS (Ludlow)

Sublette County: Pinedale, July 23, 1946 (R).

CULISETA IMPATIENS (Walker)

Carbon County: Medicine Bow Lodge, August 19, 1947 (H). Sheridan County: Sheridan, June 9, 1947 (H). Uinta County: Lone Tree, June 25, 1933 (R). Yellowstone National Park: West Entrance, September 8, 1945 (H).

CULISETA INCIDENS (Thomson)

Big Horn County: Greybull, August 16, 1947 (H). Converse County: Glenrock, August 4, 1944 (P). Fremont County: Lander, August 17, 1947 (H). Lincoln County: Afton, September 12, 1945 (H). Sheridan County: Sheridan, June 9, 1947 (H). Teton County: Jackson, September 12, 1945 (H). Yellowstone National Park: West Entrance and several other points in the park, September 8, 1945 and August 23, 1946 (H).

CULISETA INORNATA (Williston)

Albany County: Laramie, August 19, 1947 (H); Rock River, June 11, 1947 (H). Big Horn County: Cowley and Greybull, August 16, 1947 (H). Converse County: Douglas and Glenrock, August 5, 1944 (P). Fremont County: Lander, August 17, 1947 (H). Hot Springs County: Thermopolis, August 16, 1947 (H).

Laramie County: Cheyenne, September 9, 1944 (P). Lincoln County: Kemmerer, June 7, 1947 (H). Park County: Powell, August 3, 1944 (P). Platte County: Wheatland, August 5, 1944 (P). Sheridan County: Sheridan, June 9, 1947 (H). Sweetwater County: Green River, September 10, 1944 (P). Teton County: Moran, July 3, 1934 (R). Uinta County: Evanston, July 24, 1936 (R); Ft. Bridger, August 21, 1947 (H). Washakie County: Worland, August 16, 1947 (H). Yellowstone National Park: Fishing Bridge, Madison Junction and several other points, September 8, 1945 (H).

MANSONIA PERTURBANS (Walker)

Platte County: Chugwater, June 10, 1947 (H). Uinta County: Evanston, August 10, 1946 (H).

PSOROPHORA SIGNIPENNIS (Coquillet)

Johnson County: Buffalo, June 10, 1947 (H). Washakie County: Worland, August 16, 1947 (H).

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A NEW SPECIES OF *SIREX* FROM CALIFORNIA

(Hymenoptera: Siricidæ)

BY WOODROW W. MIDDLEKAUFF
University of California, Berkeley

Since the publication of Bradley's monograph on the nearctic Siricidæ in 1913, no new species in this family have been described from North America. It is, therefore, felt desirable to bring to the notice of workers in this group the description of a new species occurring in California.

Inasmuch as living larvæ of Siricidæ have been introduced into various countries in shipments of timber, it was necessary to eliminate the possibility of its being an introduced species. With the appearance of Benson's recent work on the Siricidæ of Europe and Asia (Benson, 1943), all of the faunistic areas of this family have now been rather well covered. Keys to the Nearctic species were given by Bradley (1913), to the Palearctic species by Gussakovskij (1935), while the species of the Japanese Empire were given by Takeuchi (1938). After a careful search of these papers, the possibility of its having been previously described is fairly remote. There are no known native Siricidæ in Australia or South America and no species of *Sirex* in the Ethiopian region.

I am indebted to Dr. Robert B. Benson of the British Museum for examining the holotype.

Sirex longicauda Middlekauff, new species

Female. Length of body, from head to tip of cornus 29 mm.; length of forewing 20 mm.; length of ovipostor 27 mm.; length of saw sheath 27 mm.; ovipostor: forewing ration 0.69. Color: head, antennæ, thorax, abdomen, and legs except tibæ and tarsi metallic blue-black. Tibæ and tarsi reddish brown. Saw sheath and ovipositor variable, reddish brown to blue-black. Wings slightly infuscated along veins and around the apical margin. Veins reddish brown to dark brown.

Head, thorax, basal segment of antennæ, and two basal segments of the abdomen rather densely clothed with a long greyish-black pubescence. Legs are somewhat less pubescent than the thorax. The antennæ beyond basal segment progressively less pubescent. Antennæ with 25 - 26 segments, the basal segment finely punctate.

Head and thorax densely and finely punctate, the pronotum and femora coarsely rugose. Post genæ and post ocular areas sparsely

punctate. Precornal basin bounded laterally by prominent shoulders. Cornus as in fig. 1, A and B, elongate, arched with an indistinct ridge towards base.

This species may be separated readily from *Sirex areolatus* (Cresson) on the basis of the reddish tibiæ and tarsi and by the shape of the cornus; and from *Sirex juvencus cyaneus* Fabricius by the shape of the cornus, color of legs and the very long ovipositor and sheath.

Holotype, female, BERKELEY, CALIFORNIA, April, 1932, *Abies concolor* Lindl. and Gord., in the collection of the California Academy of Sciences. *Paratype*, one female, Miami Ranger Station, Madera Co., Calif., June, 1942. In the collection of the

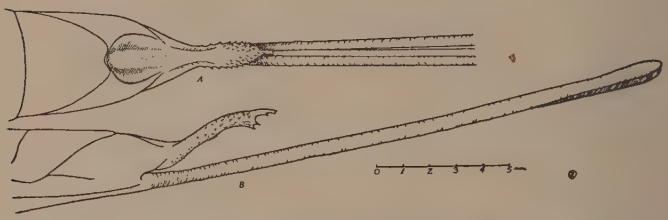

Fig. 1. Apex of abdomen of female *Sirex longicauda*. *A*. Dorsal view showing constricted cornus and precornal basin. *B*. Lateral view showing arched cornus and relative length of saw sheath.

United States Department of Agriculture, Division of Forest Insects, Berkeley, California.

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THE GENUS ITOLIA WILCOX
(Diptera: Asilidae)

BY J. WILCOX
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The genus *Itolia* and the species *maculata* were described[2] from limited material largely collected by D. K. Duncan in Arizona. Since then large series of this species have been seen, which help to clarify the status of the species. These series were collected in several localities in Arizona by Owen Bryant and F. H. Parker (Tucson, June and July; San Carlos, August; Roosevelt Lake, August; and Canyon Lake, August). Several years ago P. H. Timberlake collected a single specimen of a new species near Palm Springs, California, and during the 1947 season additional specimens of this species and specimens of another species were taken in Arizona and are described herewith. The specimens are in the writer's collection unless indicated otherwise. I am indebted to Owen Bryant and to P. H. Timberlake for the loan of specimens.

KEY TO THE SPECIES

1. Scutellum, except the very narrow posterior margin, whitish pollinose; third antennal joint tapering apically, style slender and 4/5 the length of the third joint; pollinose bands on segments 1-4 entire or nearly so; length 7-9 mm. (Calif.) ..... *timberlakei* new species
– Apical half or more of the scutellum shining black; third antennal joint of nearly uniform width, style not more than half the length of the third joint 2
2. Legs black, at most the knees reddish; basal 1½ abdominal segments black, the remainder yellowish, pollinose bands confined to segments 1-4 in both sexes, interrupted on all segments or sometimes entire on segments 1-2 or 1-3; length 5-9 mm. (Ariz.) ..... *atripes* new species
– Apical half or more of the femora and the tibiae yellowish; basal 4 abdominal segments black, pollinose bands on segments 1-7 in male and 1-5 in female interrupted on all segments or sometimes entire on the second; length 6-9 mm. (Ariz.) ..... *maculata* Wilcox

[1] Alhambra, California
[2] Wilcox, J., 1936. Pan-Pac. Ent. 12: 201-204.

Itolia timberlakei Wilcox, new species

Male. Length 8 mm. Head black; face, frons, and occiput densely grayish white pollinose; hairs and bristles white. First two antennal joints brown and short white haired; third joint and style black; third joint gradually tapering apically and 1½ times the length of the first two joints together; style slender and 4/5 the length of the third joint.

Thorax densely grayish white pollinose, the following parts polished black: a small spot on humeri, a central stripe not reaching scutellum, a broader and shorter lateral stripe on either side crossing the suture, a small spot on the postalar calli, and the lower half of the sternopleurae. Hairs and bristles white, 3-4 presutural, 3 supraalar, and 1 postalar, all rather weak. Scutellum densely grayish white pollinose, with only the very narrow posterior margin black; disc with short sparse erect white hairs. Metanotum shining black, the slopes pollinose.

The first 4½ abdominal segments black, the remainder and genitalia yellowish brown. Segments 1-4 with complete posterior pollinose fasciae, narrow at the middle and gradually widening to the anterior corners at the sides, fasciae on segment 5 interrupted; segments 6-7 with posterior lateral spots, those on segment 7 very small. Hairs and bristles white. Venter, except narrow posterior margins of segments, gray pollinose.

Basal ¾ of the fore and middle femora, basal 2/3 of hind femora, apical ¼ of the tibae and the tarsi, black; remainder yellowish. Hairs and bristles white; claws black, basal ¼ yellowish, pulvilli white, empodium yellowish.

Halteres light yellowish, base brown; alulae yellowish. Wings hyaline, veins yellowish to light brown, anterior cross vein slightly before middle of discal cell.

Female. Length 9 mm. Similar to male. Posterior pollinose band on segment 4 of abdomen narrowly interrupted at middle and only segment 5 with a lateral pollinose spot; dorsum of segments 5-8 and venter of segments 6-8 yellowish brown and without pollen, except as indicated; apical spines brown. Hind femora yellowish brown, the basal 2/3 darker, especially dorsally.

Holotype: Male, WHITE WATER, CALIF., VIII-10 '47 (J. Wilcox). *Allotype:* Female, same data. *Paratypes:* 19 specimens, same locality VIII-9 and 10 '47 (Guy F. Toland and Wilcox); and INDIO, CALIF., VIII-9 '47 (Toland and Wilcox); one specimen, SNOW WASH, CALIF., VII-2 '36 (P. H. Timberlake) in the collection of the Citrus Experimental Station, University of California.

Named in honor of P. H. Timberlake, who first collected this species and who has collected a number of other fine Asilidae.

Itolia atripes Wilcox, new species

Male. Length 7 mm. Head black; face and front silvery pollinose, occiput gray pollinose; mystax, hairs, and bristles white. Antennae dark brown, first two joints subequal in length, short white haired; third joint 1½ times the length of the first two joints together, broadest at base and of nearly uniform width from there on; style same width as apex of the third joint and about ½ of the length of the third joint.

Mesonotum gray pollinose with the usual three broad shining black stripes; humeri and postalar callosity shining black; hairs and bristles white, 2 presutural, 1-2 supraalar and 1-2 postalar. Pleurae gray pollinose, the sternopleurae largely and the Pteropleurae with a small spot shining black; hairs and bristles white, with two posterior bristles and some rather long hairs on the mesopleurae. Scutellum shining black, the basal 1/3 gray pollinose; a number of fine erect white hairs posteriorly.

Abdomen yellowish red, the first segment black and the second basally dark brown; first three segments with broad posterior gray pollinose bands which are narrowly connected at middle; posterior corners of fourth segment gray pollinose. Hairs white, long, numerous and bristle-like on sides of first segment, short otherwise. Genitalia yellowish red with touches of brown, hairs white.

Coxae black, largely gray pollinose and long white haired. Legs black, somewhat reddish at the knees; hairs and bristles white. Claws black, the bases reddish, pulvilli whitish, empodia reddish.

Halteres light yellow, the lower stem brown; alulae yellowish brown. Wings hyaline, veins light brown, anterior crossvein just before middle of discal cell.

Female. Length 6 mm. Similar to male. Pollinose band on third abdominal segment broadly interrupted, ovipositor brown, apical spines reddish. Anterior crossvein at 2/5 the length of the discal cell.

Holotype: Male, MOHAWK, ARIZ., IX-6 '47 (J. Wilcox). *Allotypes:* Female, same data. *Paratypes:* 60 specimens from the type locality IX-6, 7, and 10 '47 (Itol J. and J. Wilcox); AZTEC, ARIZ., VIII-27 and IX-7 '47 (Wilcox); and WENDEN, ARIZ., VIII-17 '47 (Wilcox).

The pollinose markings on the abdomen are much less intense and more indefinite than in the other two species, and in a number of specimens the bands are interrupted on all segments on the dorsum. In some specimens the basal half of the scutellum is pollinose, and the tibiae dorsally are dark reddish on the basal half. the Three black stripes on the mesonotum in this species and in *maculata* are wider than in *timberlakei.* The specimens included in the paratype series of *maculata* from Bill Williams Fork, Ariz., apparently belong to this species.

THE ECOLOGY OF AN ITONIDID FLY ASSOCIATED WITH A RUST ON BACCHARIS PILULARIS CONSANGUINEA

BY JOHN MARSHALL HARVEY[1]
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The gall midge under study herein has been named and described as a new species, *Clinodiplosis pucciniae*, by Dr. A. Earl Pritchard of the University of California (3). This fly was collected by Mr. J. W. Tilden in the course of work on the insect fauna of its host plant. The present writer engaged in a study of the life history of the midge before its identity as an undescribed species was determined by Dr. Pritchard, to whom specimens were sent for identification. Acknowledgments are due to Dr. Pritchard for his identification and description of the midge which have relieved the writer of the necessity of laboring over its taxonomy and to Professor Ferris of Stanford University for his direction through the course of this study.

The fly is associated with the fungus, *Puccinia evadens* Harkness, which is a rust that occurs on *Baccharis pilularis* subspecies *consanguinea* (deCandolle) C. B. Wolf. This evergreen shrub, sometimes called chaparral broom or coyote brush belongs to the family Asteraceae and occurs in some abundance over considerable areas of California.

Only the aecial stage of the rust bears an ecological relationship with this midge. It is the only stage of the rust which persists over a long enough period to provide an adequate and lasting food supply for the larvae of the midge.

LARVAL PERIOD

When the larvae hatch from the eggs, they are almost colorless. Those larvae hatching outside the aecia soon crawl into the spore mass. Here, as they begin to feed on the spores of the fungus, they assume the orange color of the spores.

Growth is very rapid immediately after hatching, providing the food supply is plentiful, the size increasing as much as three times within two days. In their early stages the larvae are quite elongated, but as they mature they seem to become proportionately shorter and wider.

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[1]The present study was completed at Stanford University.

Both the eggs and the young larvae are very susceptible to drying and when raised in captivity care must be taken to provide sufficient moisture. Usually a small bit of cotton or sand wet with a drop of water daily placed in the container being used for the larvae is sufficient to allay drying.

The larvae are most active in the spring, although the fall is an almost equally active period. Obviously the larval population is conditioned by the prevalence of the aecia whose numbers vary with the seasonal and climatic changes. In April an infested twig one half inch in diameter and one and a half inches long was observed to have fifty-seven larvae upon it. The eggs and larvae in various stages of development are found throughout the year. The smallest number of larvae is observed during the late summer months. The larvae which survive the dry season tend to become more sluggish and many build cocoons in preparation for the pupal stage. These cocoons are often built in the spore mass, in aecial pits which have dried out or on the surface of the soil. In captivity the larvae can be induced to build a cocoon between layers of paper toweling.

Building a cocoon is a fairly rapid process, requiring only one or two days. One larva was observed which completed its cocoon in the fold of a bit of paper toweling in only twenty-four hours. The cocoon is composed of minutely small silken threads, is arranged in a rather irregular network apparently with no set pattern, and is completely closed. The larvae secrete these threads from their mouths, probably a product of the salivary glands.

Though one commonly secures adults by raising them from specimens of the rust on which the larvae have built cocoons, the large number of larvae which fall from the fungus leads to the assumption that the building of cocoons may also occur in the soil. As mentioned above, larvae have been induced in the laboratory to spin cocoons in paper toweling. In their natural habitat it is quite conceivable that the larvae may build cocoons in the leaf mat below the plant. Furthermore, during the fall of the year, large numbers of eggs were found on the fungus, although close examination of numerous rust specimens revealed no cocoons. Inasmuch as the eggs are quite fragile and ordinarily hatch within five to eight days, it is evident that the adults, which live only a few days, had emerged currently from some place other than the fungus, probably from the soil. Rübsaamen (4) has found that some larvae of the closely related genus, *Mycodiplosis*,

pupate in the soil. Circumstances would seem to indicate that it is the exception rather than the rule for the larvae to pupate in the fungus. With specimens of larvae reared in the laboratory, a much greater percentage of the larvae fell out of the fungus than remained therein.

The larval stage is by far the longest stage in the life cycle of this species, sometimes lasting several months, in contrast to the two to four days of life as an adult midge, to the eight days of life as a pupa, and to the comparably short period of existence in the egg. Larvae were observed in the laboratory in cocoons on a twig, remaining without any apparent change in form from May until October.

A twig heavily parasitized by rust was collected on November 13. Examination under the microscope revealed that numerous eggs were present scattered in and around the aecia, the latter showing no evidence of being attacked by larvae. A further search of the twig revealed no larvae present. On the second day after collection numerous first instar larvae appeared. These immediately began to feed on the rust, growing very rapidly and causing a great number of white, empty spore cases to collect above the aecia. The larvae continued to attack the rust vigorously until November 25 at which time their food supply showed signs of being depleted. Many of the larvae had grown to full size by this time and many had left the twig, falling to the bottom of the plugged phial in which the twig was contained. On November 26 two pupae, not enclosed in a cocoon, were found on the bottom of the phial. The adults emerged eight days later. Allowing five to seven days for the eggs to hatch and three days as adults, the life cycle required approximately thirty-two days. This, however, took place in the laboratory where the atmospheric factors were favorable and the food supply was plentiful. In less favorable circumstances one would expect the cycle to take longer, as evidenced by the long larval period during the summer months cited above.

The generations apparently overlap, creating a situation wherein there are always specimens present in various degrees of development. At least this seems to be the case in this region where the winters are mild and the summers are not excessively dry and hot. In a region where the winters are quite severe, one would expect larvae (inside their cocoons) to undergo a resting "winter

stage." In his studies of British Itonididae, Barnes (1) found that emergence of the adults was retarded by cold weather and that the larvae remained in the cocoons until spring.

NUTRITION

Larvae in all stages of development are often found with their heads buried far down into the aecia, suggesting that they might well take their nutrition from the juices of the rust mycelium as well as from the rust spores. This, however, was not definitely determined. Aecia have been observed which have been completely devoured within seven to eight days by the feeding of from six to ten larvae in each.

Due to the small size and structure of the mouthparts of the larvae the fungal spores cannot be ingested but are sucked dry of their contents. Spores were never found in the intestinal track of the larvae, though globules of orange oil similar to those contained within the spores were found. These globules of oil became readily visible if the larvae and also the spores were boiled in a potassium hydroxide solution. Since the spore walls are not broken down by this treatment, they would appear, if present, within the body wall of the larvae. Grasse (2) found larvae of *Mycodiplosis reaumuri* Kieffer and *Mycodiplosis tremulae* Kieffer living on the underside of leaves infested with fungi. He states that the larvae pierce the spore envelope with fine sylets and then suck out the contents. With *Clinodiplosis pucciniae* Pritchard the great accumulation of white, empty spores in the vicinity of the working larvae serves as evidence that the spores are not eaten but that their contents are merely sucked out.

METHOD OF LOCOMOTION

The method of movement of a larva was observed as it crossed a smooth glass surface. Forward motion was brought about by issuing forth a thin silky thread from the tip of the mouth parts. The thread was attached or stuck to the glass surface. The body of the larva was then contracted with a peristaltic-like motion, drawing the posterior end forward. The posterior end is capable of sticking to the glass surface and with an elongation of the body the anterior portion is again thrust forward whereupon the thread is reattached at a new forward position. In this way the larvae are capable of a relatively rapid movement even on a smooth

surface. This means of locomotion even permits the larva to scale a vertical surface. One larva two milimeters in length was observed to move over a paper surface at the rate of two centimeters per minute.

Larvae have also been observed in locomotion without employing the thread. In the natural habitat locomotion is further facilitated by bristles situated over the body surface which aid the organism in acquiring a hold on the substrate. In addition the mouth parts form a projection with which the larva can anchor itself into irregularities in the substrate and pull itself forward.

The silky web secreted by the larva is readily visible in the infested aecia of *Puccinia evadens* Harkness. The web causes the shed spores and empty spore envelopes to be held together in a mat covering the fresher, still attached spores beneath. This condition is disadvantageous to the rust in that it allows fewer aeciospores to be disseminated. On the other hand the mat o spores provides protection for the larvae, which are usually embedded in the aecia beneath it, both from excessive drying and from the possibility of becoming the prey of birds or large predacious insects.

PUPA

The general structure of the pupa does not differ greatly from that of other Itonididae. It is worthy of note, however, that a pair of strong, cephalic bristles are inserted in the region between the eye position of the pupa. These are to be distinguished from the so-called "cephalic horns" which are located just anterior to the insertion of the antennal rudiments and which are not particularly produced in this species. The bristles probably function in the penetration of the cocoon wall by the pupa. A number of empty puparia was found which were protruding from the cocoon with only the tip of the abdominal portion remaining embedded in the wall of the cocoon. Apparently the pupa breaks out of the cocoon just prior to the emergence of the adult.

A female midge was observed emerging from its puparium. The puparium splits longitudinally along the dorsum in the head region. The head of the insect emerges first followed by the thorax, the wings, the abdomen, the antennae and last the legs. Immediately after emergence the legs appeared to be quite incapable of supporting the body of the imago. However, within a few minutes the chitin in the legs appeared to have become firm

enough to provide adequate support. The wings were wrinkled and folded on emergence, but rapidly expanded to their normal size. The insect maintained a horizontal resting position while expanding the wings and the expansion of the wing seemed to accompany a series of convulsive movements of the thorax near the wing attachment. The length of time required for complete emergence amounted to slightly less than five minutes.

The eyes, wings, antennae, and legs become a dark gray before emergence from the puparium. The color of the thorax and abdomen is a pronounced orange immediately after emergence, but this gradually darkens to a gray color within a few hours.

ADULT

The length of time spent in the adult stage is very short. Imagoes reared from larvae in the laboratory were never observed to live over three days. They do not appear to be especially strong flyers. In the laboratory female midges did not lay eggs when they were not fertilized. The mouth parts of this species are of the type which can take up only liquid substances. An adult of this species was observed taking up droplets of water which had condensed on the surface of the glass phial in which it was contained. No further observations were made, however, in regard to the nutrition of the adult flies.

EGG

The eggs of this species of *Clinodiplosis* are ellipsoidal and almost transparent, having a very pale orange color. The length is approximately twice the width of the egg and the ends are of equal size and curvature. The adult female deposits them in the aecia and among the spores which have been shed and which lie around the periphery of the aecia. The chorion of the egg is covered with a quite sticky substance at the time of deposition, causing the egg to adhere to the substrate and also causing the aeciospores to adhere to the egg surface. This condition makes the egg inconspicuous and difficult to distinguish from the rest of the spore mass.

The length of time required for the eggs to hatch seems to be rather irregular. Most required from five to seven days to hatch. Eight to twelve eggs are often found placed singly in no set arrangement around an aecium.

No evidence of paedogenesis was found in this species. The larger eggs characteristic of paedogenesis were not found and

neither did larvae isolated over a long period of time ever produce eggs.

SYMBIOSIS BETWEEN FLY AND FUNGUS

The helation of the fly to the fungus has already been indicated in the discussion of the life history of the former. It may, however, be summarized as follows:

1. On the basis of all present information the fly occurs only in association with this particular fungus.

2. In its active growing period the larva of the fly lives only in the aecia of the fungus and feeds upon the aeciospores. Apparently no association exists with the other fungal stages.

3. Examination of stomach contents of fly larvae indicates that they pierce the fungus spores and ingest only the contents of the spores.

4. There is no indication that the adult flies make any use of the fungus spores as food.

5. There is no indication that the flies have anything to do with the dissemination of the fungus, since no fungus spores were found clinging to the bodies of flies.

6. The larvae eat so many of the spores, at times cleaning out almost an entire pustule, that they probably have some effect in reducing the total number of spores available for dissemination.

7. The webs spun by the larvae seem also to have a retarding effect upon spore dissemination by preventing the spores from being shed readily.

8. Thus, it appears that the relation of the fly and the fungus is quite simple, the fly feeding upon the fungus and apparently being restricted to it for its food supply, but the fungus receiving no aid in any way from the fly and being in no way dependent upon it.

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SOME NEW LYGAEIDAE CHIEFLY FROM THE UNITED STATES
(Hemiptera: Heteroptera)

BY H. G. BARBER
Roselle, N. J.

Zeropamera Barber, new genus

Body elongate, oval. Head porrect; preocular margin to base of antenna equal to the postocular margin; postocular margin gently rounded, not abruptly contracted; vertex rather strongly convex. Antennae long and slender, basal segment lightly incrassate, very nearly as long as the head. Rostrum with apex of basal segment extended to base of head, subequal to second segment. Pronotum with a well defined collar, a rather deep constriction between the two lobes; anterior lobe twice as long and one third narrower than posterior lobe; posterior lobe not depressed. Legs rather long; anterior femur moderately incrassate, with a double series of setigerous spines beneath; anterior tibia of the male straight, with a row of short inclined setigerous spinules on the apical three quarters; posterior tibia very sparsely setose; tarsus long, basal segment about three times as long as the second and third united.

Type of the genus: *Zeropamera nigra* new species.

Zeropamera nigra Barber, new species

Entire body and the femora black; very nearly nude; antennae, rostrum, tibia and tarsi sordid fusco-testaceous. Head but little longer than wide (75 x 70). Eyes prominent. Preocular portion to apex of tylus equal to remainder of the head. Ocelli more remote from each other than each is removed from the eyes. Antennae long and slender, but little shorter than head and pronotum united, basal segment extended beyond apex of head by more than one half of its length; second segment one third and third one fourth longer than basal; terminal segment only slightly incrassate, but little shorter than second (1.56, 2.36, 2.00 and 2.25 mm. respectively). Pronotum slightly shining; lateral margins of anterior lobe gently, convexly rounded, much narrower anteriorly than at the constriction; both lobes rather strongly convexly rounded dorsally; anterior lobe smooth; posterior lobe sparingly, finely punctate. Scutellum a little longer than wide, sparsely, finely punctate; apical half lightly carinate. Commissure a little less than one half as long as the scutellum. Clavus irregularly punctate. Corium sparsely, finely punctate. Membrane black, extended to apex of abdomen. Venter with a few long, scattered setae. Length 10.50 mm.

Holotype: Male, MT. WILSON, LOS ANGELES CO., CALIFORNIA, February 2, 1940 (Collected by J. R. Fisher).

Paratypes: Two females, one from SEQUOIA NAT. PARK, elevation 2000-5000 ft., June 13, 1929 (collected by Dr. E. C. Van Dyke); one with the same data as the type retained by the author. Type and one paratype in the collection of Dr. R. L. Usinger of the University of California.

Zeropamera belongs to the Tribe Myodochini, most closely related to *Pachybrachius*. Besides a marked difference in color the head is more porrect, posterior ocular margin gently rounded, not abruptly contracted; basal segment of antenna longer; anterior femur less incrassate; anterior tibia of male having setigerous spinules and the posterior tarsus relatively longer.

Ozophora angustata Barber, new species

Head, anterior lobe of the pronotum, scutellum and beneath testaceous; posterior lobe of the pronotum and hemelytron ochraceous; posterior margin of the corium narrowly brown; apex of the scutellum pale yellow; antennae stramineous, with apices of third segment lightly tinted with brown; legs stramineous, apices of femora very lightly tinted with brown; membrane lightly fumose. Elongate, narrow.

Head smooth, shining, nearly one fifth longer than wide; eyes not strongly protruding; preocular portion to apex of tylus twice as long as eye; preocular margin to base of antenna as long as posterior margin and two thirds the length of eye. Antenna long and slender, basal segment at least one third as long as head on the median dorsal line; second segment about one third longer than basal, third slightly longer than second segment; fourth segment missing. Rostrum long and slender, apex extending just past posterior coxae; basal segment extended to a point a little behind the line of eyes; second and third segments subequal. Pronotum nearly one fourth shorter than head; anterior lobe smooth, shining, twice as wide as long, including the collar; constriction between the two lobes rather shallow, the collar well defined, followed by a transverse row of punctures; lateral margins, in outline, gently convex, distinctly carinate; posterior lobe subequally long but twice as wide as the anterior lobe, rather finely and closely punctate; humeral angles smooth, somewhat elevated; posterior margin slightly concavely arcuated. Scutellum very nearly one third longer than wide, closely punctate along the lateral margins, sparsely punctate on the central surface which is occupied by a Y-shaped, smooth, calloused ridge, the anterior arms of which

do not quite reach to the basal angles on each side. Commissure almost one third longer than the scutellum. Membrane somewhat abbreviated, not quite reaching to end of abdomen. The legs are rather long; anterior femur lightly incrassate, armed with two small spines between apex and middle point; posterior tarsus very long. Length male 7.65 mm.

Holotype: male, BIG BEND PARK, BREWSTER CO., TEXAS, July 30, 1937 (collected by Rollin H. Baker). Through the kindness of Professor H. J. Reinhard, Department of Entomology, A. and M. College of Texas, this unique specimen is deposited in the collection of the United States National Museum.

This species is much narrower than any other described species, with longer antennae and legs than *picturata* Uhl.

Tempyra testacea Barber, new species

Head, pronotum, scutellum and beneath testaceous; lateral margins of pronotum, clavus, corium anteriorly, narrowly elevated margins of the latter, antennae except at incisures, legs and rostrum ochraceous; extreme bases of antennal segments 2-4 fuscous; a large whitish spot before apical angle of corium; area before and about this spot faintly tinted with brown; membrane tinted with brown, slightly paler than towards apex. Sparsely long setose on the scutellum and corium.

Head one third wider than long. Eyes globular; interocular space about twice as wide as an eye; preocular portion of head on the median line subequal to the length of an eye. Antenna with the basal segment short, passing apex of head by about one half its length, second segment just over twice as long as basal, third segment about one third longer than basal, terminal segment but little longer than second. Rostrum with the basal segment extended to the apex of the bucculae, second segment one third longer than basal. Pronotum nearly one third wider than long; lateral margins narrowly elevated, lightly constricted just behind middle; dorsal constriction between the two lobes rather shallow; disk of anterior lobe impunctate; posterior lobe rather sparsely, finely punctate; humeral angle with a slight, elevated, rounded ridge. Anterior femur strongly incrassate, provided with a number of small, unequal spines beneath; anterior tibia strongly curved. Scutellum about one fourth wider than long, rather closely punctate, obscurely carinate on the apical third. Clavus with three regular rows of punctures, one along inner claval margin, the other two parallel, nearer to the outer margin of the clavus. Commissure but little longer than the scutellum. Costal margin of the corium narrowly elevated; surface punctate in rows along the veins; pro-

fusely punctate in and about the large preapical spot. Membrane extended slightly beyond apex of the abdomen. Length male 3.25 mm.; female 3.60 mm.

Holotype: male, TUCSON, ARIZ., July 14, 1933 (E. D. Ball, collector). *Paratypes: two female,* TUCSON, ARIZ., July 25, 1936 (E. D. Ball, collector) and ARLINGTON, ARIZ., June 17, 1919 (D. E. Fox, collector). In the collection of the United States National Museum.

Besides a marked difference in color *testacea* differs from Stal's *biguttula* from Texas as follows: head and pronotum relatively narrower, anterior lobe of the latter less distinctly punctate, clavus with three rows of punctures and the apical angle of corium more profusely punctate.

Valesuris Barber, new genus

Head but little shorter and narrower than the pronotum across anterior region, strongly convex; eyes mediocre, very nearly in contact with the anterior angles of pronotum; ocelli absent. Antennae slightly incrassate; basal segment well extended beyond apex of head but little shorter than second. Rostrum extended to posterior coxae; basal segment extended to base of head, subequal to basal segment of the antenna. Pronotum with anterior margin straight; anterior angles abruptly rounded; lateral margins straight, gently converging anteriorly, nearly parallel to each other; the edge very narrowly impressed along the under side; lightly depressed a little before the posterior margin; posterior margin concavely arcuated. Scutellum equilateral. Clavus and corium connate, flat. Membrane much abbreviated. Posterior margin of corium very nearly straight. Anterior femur lightly incrassate, with several spinules towards apex. Posterior tarsus short.

Type of genus: *Valesuris pusillus* new species.

Valesuris pusillus Barber, new species

Color of head castaneous; remainder uniformly testoceous; somewhat shining; sparsely pilose. Head smooth, very faintly, sparsely punctate on the vertex; nearly one third wider than long; preocular margin to base of antenna slightly shorter than an eye; ocelli absent. Antenna with the second segment about one third longer than basal; third segment but little longer than basal, terminal segment subequal to second. Pronotum about one third wider than long, lateral margins lightly converging anteriorly to the abruptly rounded anterior angles back of the eyes, the edge not

sharply impressed, as seen from above; surface anteriorly and posteriorly very finely and sparsely punctate. Scutellum finely, closely punctate. Clavus and corium flat, in the same plane; clavus with three regular, close set lines of punctures, with another parallel row along the claval suture. Commissure but little shorter than the scutellum. Corium closely and rather coarsely punctate. Length 2.00 mm.

Holotype: male, TEJUPILCO, TEMESCALTEPEC, MEXICO, June 29, 1933. *Paratypes:* eleven specimens with the same data as the holotype (collected by H. E. Hinton and R. L. Usinger); in the collection of Doctor R. L. Usinger. One male paratype retained by the author.

Valesuris belongs to Stal's tribe Lethaeini. Judging from the author's description it seems most closely related to his South American genus *Esuris*. In this connection it should be noted that the author, in three previous articles, was in error in placing two Arizona species in *Esuris* and in assigning these to the tribe Lethaeini. One of these species was later made the basis of a new genus *Neosuris* while the other species *fulgidus* was retained in Stal's genus. In a future article the author intends to clear up the position and synonymy of these species.

Geocoris alboclavus Barber, new species

Head and pronotum anteriorly testaceous; ocelli red; apex of tylus, anterior margin of head on either side of this, three spots posteriorly on the pronotum, one in the middle and the others on the humeral angles, and apex of the scutellum, ochraceous; clavus, inner margins along the claval suture as well as the wide costal margins of the corium conspicuously white; pronotum posteriorly on either side of middle, behind the cicatrices, faintly, scutellum except at pale apex, central disk of the corium, lightly tinged with fuscous. Membrane hyaline. Beneath, with the head sordid testaceous, with a slightly calloused, oblique, pale yellow fascia on either side near the eyes, pleura and venter for the most part lightly infuscated; anterior margin of the prosternum, acetabular caps, lateral margins of venter, ostiole, basal two segments of rostrum and the femora, except beneath, pale yellow. Antennae pale above; these as well as the femora beneath, faintly fuscous. Finely pilose on anterior margins of head and along lateral margins of pronotum.

Head three times wider across eyes than long; smooth across the base; central disk before the ocelli very slightly rugulose;

eyes not quite in contact with the outer, anterior part of the pronotum. Pronotum almost one third wider than long; lateral margins parallel to the gently rounded anterior third, not angulated behind the eyes, the cicatrices conspicuous, smooth, narrowly separated at the middle and almost reaching the lateral margins on each side; surface before and behind these closely and somewhat coarsely punctate. Scutellum equilateral, rather coarsely punctate on either side of a longitudinal, carinate line which extends from apex to near base. Corium with a line of close set punctures along the claval suture, surface elsewhere except along the smooth costal margin, sparsely punctate. Membrane not quite extended to apex of abdomen. Length of male 3.20 mm.

Holotype: male, WILCOX, ARIZ., June 11, 1936. *Paratypes:* two females, July 19, 1934 and August 9, 1937 (collected by E. D. Ball). Types and paratypes in the United States National Museum.

Besides the very striking difference in color, this species differs from all of the other United States species known to the author by the fine pilosity on the fore part of the head and on the margins of the pronotum.

THE DISTRIBUTION OF MOLORCHUS IN CALIFORNIA

(Coleoptera: Cerambycidae)

While collecting at Fallsvale, San Bernardino Mts., Calif., on June 13, 1948, the author took several specimens of *Molorchus eburneus* Linsley on the flowers of a mountain lilac, *Ceanothus divaricatus*. This species has not previously been recorded from Southern California, although E. G. Linsley informs me (*in litt.*) that he has taken it in the San Jacinto Mts.

Two days later the author returned to the same plant and found a specimen of *M. bimaculatus* Say. This is an eastern species which is replaced in the west by *M. longicollis* Lec. Linsley (1931) reports this species from Yosemite Valley, but it has never before been recorded from the south.—STANLEY G. WATKINS.

A NEW ATTALUS FROM THE WESTERN UNITED STATES
(Coleoptera: Malachidæ)

BY BORYS MALKIN
California Academy of Sciences, San Francisco, Calif.

Several years ago I sent a lot of beetles for identification to the late Dr. F. E. Blaisdell. Returning these, Dr. Blaisdell called my attention to a species of *Attalus* as being new. Since the specimens remained in my collection unnamed for a number of years, I am presently taking the opportunity to describe this species, naming it, as it seems proper, after Dr. Blaisdell.

Attalus blaisdelli Malkin, new species

In general shape more elongate than the usual forms of *Attalus*. *Head*: black throughout except labrum and mandibles which are yellow. Disc of the head very shining, reticulate with an impression in the middle. Slightly longer than wide. *Thorax*: entirely black, very shining, almost impunctate. The few punctures present are very feeble and irregularly spaced. Wider than long, more so in the male than in the female. Proportions of thoracic length to width as follows (given as proportions only, not as actual measurements): Male, 2 : 2.5; Female, 2.3 : 2.7. *Thorax* with a very distinct impression on disc. Rows of setæ along thoracic margins. *Elytra*: greenish-black with metallic dull lustre. Sides of elytra and suture dark yellow to rufous except the anterior third which is similar in color to disc. Surface of elytra reticulate, coarse. Dark, erect bristles present along the sides and suture. *Abdomen*: black in the male, yellow in the female. Mesosternum dark. *Legs*: black except base of femur which is yellow. Tarsal spur not dilated at base. *Antennae*: In male half as long as entire body, strongly serrate, segments one and one half times as long as wide. In female the length of antennæ is somewhat less than in the male with segments more slender and feebly serrate. Also, the female's intermediate segments are twice as long as wide. In both sexes the basal segment is elongate, the second very short and round while the apical segment is sharply pointed. The color is generally rufous but the first three segments are slightly paler than the remainder. All are covered with minute hairs. Length: 3.2 to 3.7 mm.

Holotype male and allotype female Nos. 5913 and 5914, Calif. Acad. Sci., Ent., and two paratypes collected by the writer from flowers of an undetermined plant in open country near BOISE, IDAHO, 15 June, 1941. The paratypes are in the writer's collection.

Fig. 1. *Attalus blaisdelli* Malkin

This species seems to be most closely allied to *Attalus demissus* Fall.* The color pattern is exactly the same. Size would differentiate the two species, *demissus* being considerably smaller 2.3 to 2.5 mm.). The antennæ provide another clue, being shorter in *blaisdelli* but on the other hand much more strongly serrate and having wider segments. Also the thoracic impression is lacking in Fall's species while the thorax is less punctate. The difference in locality is not significant. *Demissus* has been described from Colorado and material collected of both species is insufficient to define their geographical distribution correctly.

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* Fall, H. C. 1917. "Short Studies in the Malachidae." Trans. Am. Ent. Soc., XLIII, pp. 67-88.

DEFENSE MECHANISM EXHIBITED BY LARVAE OF CHRYSOPA CALIFORNICA COQ.

(Neuroptera: Chrysopidae)

BY CHARLES E. KENNETT

Division of Biological Control, University of California
Albany, California

An interesting observation concerning the larval instars of the California green lacewing, *Chrysopa californica* Coq., has been noted at Albany, California, by the writer during the months of April and May, 1948.

Some 5,000 first and second instar lacewing larvae were liberated on a planting of the ornamental shrub, *Pittosporum tobira*, in order to observe their effectiveness as predators on the sunflower aphis, *Alphis helianthi* Monell,[1] colonies of which were just beginning to flourish. The aphis colonies were attended by large numbers of the Argentine ant, *Iridomyrmex humilis* Mayr, which were feeding on the honeydew secreted by the aphids. The ants completed their role as trophic symbionts in serving as protectors of the aphids against parasites and predators.

Most of the lacewing larvae were liberated by dusting them by the hundred onto the shrubs. Several hundreds, however, were liberated individually on the shrubs by means of a camel's hair brush. During the latter procedure an interesting observation was made. When a larva was placed on a leaf which was continually visited by ants, it was immediately susceptible to attack by one or more ants. In coming upon a larva the ant does not hesitate to attack. It makes a quick thrust with its mandibles, securely grasping the abdomen of the larva. The reaction of the larva to attack is immediate. It attempts to bring the tip of its abdomen, which is extremely flexible and can be moved in any direction, into contact with the ant's head. If successful in contacting the ant's head, a fluid secreted from the tip of the abdomen is transferred to the ant. The secretion is extremely repulsive to the ant which instantly releases its hold and begins crawling backwards, rubbing its head on the plant surface in an attempt to rid itself of the substance.

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[1]Determined by E. O. Essig.

In many instances the lacewing larva was not successful in bringing its abdomen into striking position and perished after the ant had bitten it in a malaxatory manner. The dead larva was then either discarded or carried aloft by the ant down the leaves and stems towards the ground. In the latter case, the ant usually encountered others of its species which attempted to assist it in carrying off the dead victim. This resulted in a scramble which found the larva being transferred from one ant to another until it was discarded.

There are several reasons why the lacewing larva succumbs to the ant, the most important being the size of the larva. The newly hatched, unfed first instar larva is the most vulnerable to attack because of its extremely small size and awkwardness. It does exhibit the ability to secrete the repellent fluid, but in attempting to contact the ant's head the larva is handicapped by its small size. The first instar larva which has fed and increased in size is better able to defend itself, though still quite vulnerable to attack. The second instar larva shows a marked improvement over the first in repelling its attackers. Several larvae at this stage were observed to repell as many as 10 to 15 ants, one at a time, over a period of several minutes before finally being overcome. At this stage the larva has gained sufficient size to be able usually to bring its abdomen into effective use. Here again the larger second instar larva is less vulnerable than the smaller second instar larva.

Twenty five third instar lacewing larvae were liberated individually in the same manner as the first and second instars. They were found to be completely invulnerable to the ants. The ant attacks in the same manner as previously described but is at a great disadvantage because the larva is by now much larger than its assailant. When attacked by one ant, the third instar larva is merely disturbed and immediately brings its abdomen into play, giving the ant a liberal application of the secretion. In this case the amount of secretion is enough to repell the ant if placed anywhere on its body. In several instances, where a large amount of the repellant was secreted, the ants apparently became paralyzed for a period of 10 to 15 minutes. When several ants attack, the larva becomes much more agitated and usually drops from the leaf or branch to escape its attackers. If not no easily dissuaded, it may swing the tip of its abdomen in a wide arc, secreting the repellent rather copiously. This procedure usually drives off the

ants. The more tenacious ant, however, even though hit with the repellent, cling to the larva with their mandibles and are dragged along by the larva in its desparate attempt to escape. These ants generally become paralyzed and offer no resistance to the larva. The larva may also bring its mouthparts into use to rid itself of the clinging ants. When a third instar larva, feeding on an aphid, is attacked by an ant, it does not release the aphid but continues to feed, at the same time repelling the ant with the secretion. In no case did a third instar larva succumb to the ants.

Book Notice

Insect Natural History, By A. D. Imms. Collins, 14 St. James's Place, London. xviii + 317 p., 40 coloured pls., 32 pls. in black and white, 40 text figs., 8 maps. Price 16 shillings. 1947.

This, volume 8 of "The New Naturalist. A Survey of British Natural History," edited by J. Fisher, J. Gilmour, J. Huxley, L. D. Stamp, and E. Hosking, is nothing short of fascinating. The illustrations, mostly by S. Beaufoy, are almost uniformly fine, and the colour plates, especially those of dragon flies, are magnificent. In nearly all cases the insects are shown as live specimens in their natural habitats.

The discussion is centered on the British fauna, but the style is so easy, the subject matter so broad, and the species figured so typical, that the book is equally readable on this side of the ocean. There are chapters on: insect structure and transformations, classification and naming, wings and flight, the senses, feeding habits (2), biological control, galls, methods of protection practiced by insects, reproduction, aquatic insects, social life (2). There is a definite attempt to stimulate the amateur, and references are made to various phases, especially the distribution of species, in which he can provide valuable scientific data.—Hugh B. Leech.

A NEW RACE OF INCISALIA ERYPHON FROM WASHINGTON

(Lepidoptera: Lycaenidae)

BY F. H. CHERMOCK AND D. P. FRECHIN
Butler, Pennsylvania, and Bremerton, Washington

INCISALIA ERYPHON Bdv.

The authors possess good series of this species from many localities over the known limits of its range. Examples from eastern Washington we tentatively place under the typical race. However, a large series from various localities in the Puget Sound Basin exhibits constant characters of subspecific value. We therefore propose a new name for this form.

Incisalia eryphon sheltonensis Chermock and Frechin, new subspecies

Noticeably smaller and less robust than typical *eryphon*, expanding 22-26 mm., *Sheltonensi* is very close to typical *eryphon* on the upper surface, differing in the slightly deeper ground color. However, the new race is immediately separable by the diagnostic under surface. Fore wing: Slightly darker ground color, with the dark markings accentuated. Secondary: A darker ground color, inclined to reddish purple, with all dark markings well accentuated. The normal *eryphon* pattern of the basal and discal area is partially to completely obliterated by dark brown, which is in turn overcast with reddish purple. The black zig-zag line paralleling the marginal markings is bold and heavy.

This new race is an example of parallel variation in that it presents an underside macular pattern very similar to the same area in *clarki*. Hence *Sheltonensis* bears much the same relationship to *eryphon* that *clarki* bears to *niphon*.

Sheltonensis is apparently restricted to Washington, British Columbia, and northern Oregon, coastal. It is not a common insect on Puget Sound, and flies only briefly in late April and early May. The largest colony known to the authors is situated on a jack pine prairie near Shelton, Wash.

Holotype, male, and allotype, female, SHELTON, WASHINGTON, IV-26-47. Seventy-six paratypes from Shelton, Belfair, Stimson Creek, and Mason Lake, all in Mason County; Gorst Creek, and Chico Creek, Kitsap County, Washington.

The primary types will be deposited in the Carnegie Museum, Pittsburgh, Pennsylvania.

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